[METHOD FOR GENERATING 2D OVSF CODES IN MULTICARRIER DS-CDMA SYSTEMS]

Abstract of Disclosure

A code tree of two-dimensional orthogonal variable spreading factor (2D-OVSF) code matrices for a multicarrier direct-sequence code-division multiple-access (MC-DS/CDMA) communications system is generated by providing two sets of 2 × 2 orthogonal matrices $\{A^{(1)}_{(2\times 2)}, A^{(2)}_{(2\times 2)}\}$ and $\{B^{(1)}_{(2\times 2)}, B^{(2)}_{(2\times 2)}\}$. The first set of 2 × 2 matrices is used to generate a pair of sibling nodes in the code tree that respectively represent matrices $A^{(1)}_{(2\times 2^{\alpha})}$ and $A^{(2)}_{(2\times 2^{\alpha})}$ by iterating the relationship:

$A(1)_{(2\times 2^{1+\beta})} = [A(1)_{(2\times 2^{\beta})} \quad A(2)_{(2\times 2^{\beta})}]$, The matrices $A^{(1)}_{(2\times 2^{\alpha})}$ and $A^{(2)}_{(2\times 2^{\alpha})}$ are

$A(2)_{(2\times 2^{1+\beta})} = [A(1)_{(2\times 2^{\beta})} \quad -A(2)_{(2\times 2^{\beta})}]$.

used to generate a child node of one of the sibling nodes. The child node contains an M × N matrix, which is found by iterating the relationship:

$A(i-1)_{(O\times P)} = [B(1)_{(2\times 2)} \otimes A(i/2)_{(O/2\times P/2)}]$ where ⊗ indicates a Kronecker product.

$A(i)_{(O\times P)} = [B(2)_{(2\times 2)} \otimes A(i/2)_{(O/2\times P/2)}]$,

Figures